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Editorial

Grow More Food and Agricultural Education.

The 1941 census has revealed that the population of our province has increased from 44 millions in 1931 to 49 millions in 1941. Judging from the rate of increase, the present population of our province is expected to be over 52 millions. Though a steady increase in the population has been maintained the food production in the province has not in any way kept pace with it and even in normal years our deficit is estimated at 8 lakhs of tons of food grains which was generally made good by imports. The cessation of imports brought about by the war coupled with the increasing population were responsible for the starting of the Grow More Food campaign in the province with the object of making up this small deficit. Though the war is now over and partial imports have been resumed a vast agricultural country like India cannot afford to depend on outside supplies of food. In view of the shortage of food in many Provinces the Central Government has rightly offered contributions to several Grow More Food Schemes sponsored for stepping up production. The starting of the second Agricultural College in this province at Bapatla and the increasing of admissions in both the Coimbatore and Bapatla agricultural colleges from 48 to 96 are welcome steps in this direction.

India is a rural country and our province is no exception. About 85% of the population is concentrated in the 36,000 villages scattered all over the Province. If food production is to be increased it is imperative that the improvements advocated by the Agricultural Departments should reach the cultivator in these

villages. In this connection the existing staff of the Agricultural Department of our province is inadequate to cope with the needs of the province. It is hoped that the large number of graduates who will be passing out from this year onwards will be harnassed to meet this end. To start with, roughly one graduate will be available for every taluk, every year, for intensive nature of work necessary for the Grow More Food compaign. It is hoped that atleast for some years the successful graduates will be absorbed till a qualified man will be available in every firka so that the country may benefit from the scientific training received by these young men. While these graduates have the requisite basic qualification they may still require sufficient training under experienced officers for a period of at least three months so as to enable them to tackle the complex problems they may have to face. It is also suggested that the present degree course of 3 years may be extended by one more year, the fourth and final year being devoted entirely for imparting thorough knowledge in District work or work in scientific sections depending on the choice of the candidate. Such a training coupled with the agricultural education will give the confidence necessary for the work they choose and make them better fitted for posts in scientific sections, colonisation schemes, rural uplift work etc than pure science graduates who lack the all important agricultural bias. As already stressed our country is primarily an agricultural country where agriculture and rural industries should receive primary attention. It is here that the agricultural graduates could be suitably employed, if necessary with a preliminary training for the particular posts to which they are selected.

SOME USEFUL PLANTS FOR GREEN MANURE PURPOSES

By

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I. Macaranga Peltata.

Associated with the urgent need for increasing our food production, is also the need for exploring new sources of green leaf manures for appling to paddy fields. The problem is easily solved in districts where rank vegetation or forests are within an easy reach of paddy fields, but the chief paddy-growing regions like the deltaic areas of Godavari and Tanjore do not have, as a rule, any forest lands in the vicinity of paddy fields. For such areas, a quick growing large leaved inedible shrub that can also stand heavy pruning would be a very great boon. A plant of this type is available in *Macaranga Peltata, Muell* a description of which is given below:—

Macaranga peltata, Muell. Arg. (family: Euphorbiaceae; Syn. Tamil *Vattakanni*, Malayalam, *Podivanni*, Upplli or Vatta).

This is a quick growing tree growing wild to a height of 40 feet, in the laterite soils of Malabar, though Gamble has recorded its occurrance in the hilly areas of the Northern Circars also. The plant produces numerous leaves which are large, crowded and heartshaped as shown in the photograph. The leaves are not eaten by cattle. The tree can stand drastic pruning and is capable of putting forth bushy growth within two to three months after pruning.

Flowering occurs during February-March; the flowers being small, inconspicuous and dioecious, that is the male and female flowers are borne on separate plants. The fruits are also small and these get shed during the hot weather before the Southwest monsoon rains commence. With the setting in of monsoon, these seeds germinate all round the parent trees, producing a plentiful supply of seedlings which are used for planting as hedge plants in compounds.

The ryots on the west coast systematically prune this tree if these are within easy reach and apply the loppings as

MACARANGA Peltata

green manure for their paddy field. As such it would seem to be quite a useful plant worth spreading particularly in the deltaic districts for use as a source of green leaf manure for paddy fields. The plant is not without other uses. Coffee plants are reported to thrive well when planted under the shade of *Macaranga Peltata*. Watts has recorded that the gummy exudation from the cut branches is useful for taking impressions of coins, leaves etc The tender shoot and leaves are valued medicinally while the fruits are reported to be eaten during famine periods.

II. Rothia Trifoliata Pers.

India is at present facing a serious food crisis, because of two causes, namely the failure of the monsoon and the difficulties in import. The problem therefore that confronts every Government today is to devise ways and means of producing more food. In this effort, manuring plays no small part. Our ryots are poor and can ill-afford to purchase costly manures.

Green manure is not only cheap but very efficient in many ways. In regard to fields adjoining the forest area there is no dearth of green leaves, but in the districts formed by the river deltas and in coastal areas, procurement of enough green leaf for the rice crop is a problem Through the efforts of the Agricultural Department, seeds of leguminous crops. especially those belonging to the genus, *Sesbania*, *Crotalaria*, *Tephrosia*, *Phaseolus* etc., are being distributed to the royts; for use as green manures. In ordinary soils these plants are successful, but in saline or alkaline soils these are not quite as successful. In this note, the description and performance of a leguminous plant that is capable of growing under extreme saline conditions are recorded. This is a *Papilionaceous* plant *Rothia trifoliata*, Pers. This has been found growing wild very close to the water edge along with *Spinifex* formations on the sea-coast of Chowghat in Malabar, and very close to the water edge Woodrow (1) has recorded it in Western India and Cooke (2) mentions its distribution in the sandy areas of Bijapur, Berhampur and Belgaum, while Triman (3) records its distribution in the dry sandy regions of Ceylon and finally Gamble (6) mentions its occurrence in Northern Circars and Deccan and Carnatic in dry districts, in fields and on wastlelands.

From the specimens at the Madras Herbarium, it is seen that collections of this plant have been made at various localities of Madras Presidency, namely :—

(1) Bellary District — rocky area – altitude 1,000 ft.

(2) Chingleput District — sandy areas of Sandras, as well as in the interior scrub jungles of Vandalur.

(3) Coimbatore District — Hilly areas of Kollegal Taluq ;

(4) Godavari District — Sandy areas of Annavaram (Coastal Village)

(5) Nilgiris — Altitude 7,000 ft.

(6) Shevroy Hills — Altitude 4,000 ft.

(7) Tinnevelly District — River-beds;

(8) Vizagapatam District— Anakapalle (an interior town).

It will be seen that it occurs from sea-level to an altitude of 7,000 ft. not only in sandy soils but in laterite and rocky soils

as well. Its occurrence in the sea-coast along with *Spinifex* formations, and so close to sea water under extreme saline conditions is however recorded now for the first time. On enquiry it is learnt that high waves sometimes sweep over the areas in which these plants were seen. Its occurrence under extreme sailine conditions is worthy of note; the paucity of suitable green manure plants for alkaline or saline areas can be solved to some extent if this plant could be successfully raised in such areas. A short description of the plant is given for the information of our readers.

A much-branched and spreading annual; spreads to a radius of 1 to 1½ feet; silky hairy in all its parts.

Leaves :— Digitately 3 foliate; common petiole —, ¼ to ⅜th inch.

Leaflets:— Mostly obovate to occasional elliptic oblong, entire, very slightly mucronate, somewhat fleshy, silky hairs more on the dorsal side, ½ inch to ¾ inch long.

Stipulate— *Stipules* :— Ovate to elliptic, leaf-like, small, ⅛ th inch long.

Flowers:— Axillary, usually 2, occasionally single.

Calyx :— About ¼ inch long, silky hairy; segments: lanceolate, very acute.

Corolla :— Yellow, standard clawed; slightly exserted.

Pod:— Narrow, linear flat, very nearly straight. 1.⅝ th to 2. ⅛ th inch long

Seeds :— Numerous, 25 to 30 in a pod.

Flowers :— September-October.

This plant is known in Tamil as "*Nurreypittan Keeray*" and in Telugu as "*Nucka Kura*".

Watt (7) records that the leaves and pods are boiled and eaten as a vegetable by the natives, especially in times of famine.

On account of its cosmopolitan nature these plants are worth a trial in saline as well as ordinary soils. As the plant flowers in September-October, ripe seeds can be gathered from November-December onwards.

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(2) Cooke (1903) .... Flora of Bombay;
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(4) Benthan & Mueller (1864) Flora Australiensis;
(5) Hooker (1879) .... Flora of British India;
(6) Gamble (1915) .... Flora of Madras Presidency;
(7) Watt (1892) .... Dictionary of Economic Products of India.

Growth and Development in Sugarcane in Relation to Methods of Preservation of Sets

By

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Introduction:

Sugarcane is normally a twelve months crop. In this Province it is generally planted from February to April and harvested during the same months of the following year. Thus planting and harvesting synchronise.

After the introduction of Coimbatore seedling canes, types that mature in 10 months, or those that can stand in the field for over 12 months without deterioration, have come into cultivation, especially in the areas covered by sugar factories. Under such conditions, planting and harvesting may not generally synchronise due to cultivation of early and late types. It is within the experience of the ryots that if sets are planted prior to January, during the cold months, germination and growth are very poor; and if planting is delayed upto or after May low yields are recorded. Therefore irrespective of the period of harvest, planting is to be done during the months of February to April and for this purpose there is a great need to devise suitable methods to enable the ryots to preserve the sets, for a maximum period of two months and thus overcome the problem.

With this object in view, an experiment was conducted for three years on the Agricultural Research Station, Anakapalle and the results are reported hereunder.

2. *Material and method:* — The seed preservation experiments were conducted on Co. 419, the most popular variety in this Province.

The ryots of this Province are at present adopting a few methods to preserve the sets or overcome the problem by other methods.

(1) Short crop – in a separate plot, cane sets are planted in February or early in March; the canes here are cut after 6 – 7 months and the sets are re-planted in another plot. The canes from this plot are reserved for seed purposes only. (2) a portion of the crop at harvest time is reserved for seed purposes, and in such cases, the entire cane is cut into sets with three buds and planted as against the local practice of utilising the top half of the cane for cutting sets. (3) Sets are planted at harvest time and the seedlings are replanted later on. (4) Sets are preserved in heaps covered with trash. (5) Canes are preserved in pits (North west Frontier Province method) (6) Bundles of sets are planted vertically in a puddle and covered with trash (Kurnool method).

Of the above methods items 4, 5, and 6 can be easily practised by the ryots and as such they were tested against the local method of planting as detailed below.

i. *Heap method :* – Top sets were left in shade, covered with trash, and kept moist for 15, 30 and 45 days from the date of harvest.

ii. *North West Frontier method:*— Whole canes after cutting off the tops were put in a pit and covered up with earth for periods 15, 30 and 45 days from the date of harvest

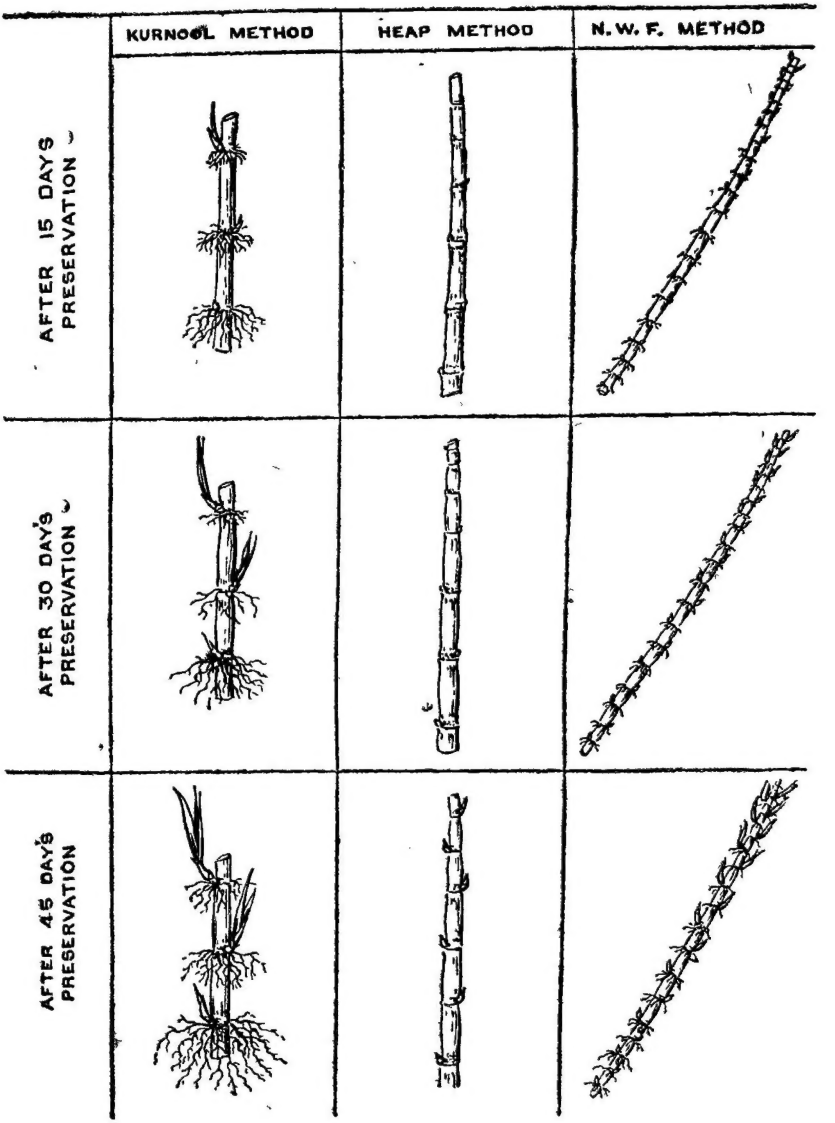
iii. *Kurnool method:*— The top sets were planted vertically in a puddled plot, covered with paddy straw and kept moist, sets were preserved for 15, 30 and 45 days from the date of harvest.

Such preserved sets were planted at the end of the respective periods of preservation using the local method of planting top sets as control. In the control plots the sets were cut and planted immediately without being stored.

Germination, growth, maturity and yield were under study.

3. *Germination:*— The buds of the top sets at the nodes are small and dormant. When these were planted in the field germination started from the second week and progressed up to the fifth week.

In the three methods of preservation under test, it was noted that the buds showed growth of different degrees during the preservation itself, and this varied with the period, as well as



medod of storage. In the " heap method " there was no visible growth of either the buds or nodal roots upto 30 days of preservation while in 45 days, the buds and nodal roots were just active. In the case of N. W F. method, nodal roots developed throughout the length of the cane, but only the buds at the top end were active by the 15th day. By 45 days the buds elongated to 1/2″ to 5″ those at top ends being the longest. The nodal roots were 2″ to 3″ long at all the nodes. The buds were

etiolated. In the case of "Kurnool method" the buds and nodal roots were very active from the 15th to the 45th day, the buds and roots growing to a length of 4" to 5". The top buds were longer than the bottom ones, while the reverse was the case with nodal roots.

Since the buds sprouted during the course of preservation, planting in the field had to be done most carefully to avoid any damage to the developing buds

Germination of normally planted sets was rapid upto the second week and progressed upto the fourth week. In the 'control', 'heap method', and 'Kurnool method', most of the buds germinated by second or third week while in "N W F. method", most of the shoots came up slowly and progressed upto the fourth week, after which a few buds only germinated. This was evidently due to the fact that in the N W. F. method of preservation, the buds had already sprouted, and were etiolated, and they were too weak to push up the top soil, and emerge. The final germination counts as presented in Table I showed that the heap method, was either equal to or better than the control, while the 'Kurnool method' and "N.W F. method" adversely affected germinatian.

Table I.

	Treatment and duration.		Percentage Germination. I year.	II year.	III year.	Mean.
1.	Heap method	15 days	44·81	65·82	51 83	54·15
2	do.	30 days	36 58	64 01	62·72	54·37
3.	do.	45 days	48 72	57·10	52·15	52·66
4.	N.W.F. method	15 days	19·39	50 54	35·39	35·11
5.	do.	30 days	23 43	38·91	31·88	31·41
6.	do.	45 days	21 85	31 25	22·11	25 07
7.	Kurnool method	15 days	44·48	51·21	36·53	44 07
8.	do.	30 days	57·48	50·37	62 89	56·91
9.	do.	45 days	52 68	38 44	45·76	45·96
10.	Control.		38 89	49·32	56·78	48·33
11.	S. E. of treatment mean.		3·02	2·00	1 94	
12	Critical difference for significance.		8·76	5·81	5·63	
13.	Whether significant by "Z" test.		Yes	Yes	Yes	

4. *Growth:*— Height of cane from ground level to the last visible leaf joint was measured from June to February, once every month. The data are presented in Table II.

Table II. Maximum height of cane in inches.

	Treatment		I year.	II year.	III year.	Mean.
1.	Heap method	15 days	137	153	138	142
2.	do.	30 days	137	145	139	140
3.	do.	45 days	133	145	133	137
4.	N.W.F. method	15 days	144	150	141	145
5.	do.	30 days	148	147	138	144
6.	do.	45 days	130	144	123	132
7.	Kurnool method	15 days	137	155	138	143
8.	do.	30 days	138	147	138	141
9.	do.	45 days	134	143	124	134
10.	Control.		145	154	140	146
11.	S E. of treatment mean		3·32	1·94	3·32	
12.	Critical difference for Significance.		9·61	5·6	9·62	
13.	Whether significant by "Z" test.		Yes	Yes	Yes	

The heights of canes differed significantly between the treatments. The differences were more marked in the earlier stages, considering the rate of increase month by month, in general, the sets preserved for 45 days or 30 days by the different methods showed higher rate of growth during early stages even though they did not reach the same total heights as the control.

Measurements of length, the girth of internodes recorded at the time of harvest did not reveal any significant differences due to the treatments. Only the number of internodes was the variable factor contributing to the height of cane The ratio of height measured in the field as detailed above and the length of millable cane recorded at the mill-yard was variable from 0 88″ to 0 93″, there being no significant difference between the treatments

Average weight of individual cane showed a significant decrease with the length in the period of preservation and between the treatments. The "N. W. F method" showed increase in weight of cane and this was evidently due to the sparse stand of crop resulting from low percentage of germination.

The relevant data are summerised in table III.

Arrowing:— Co. 419 does not generally arrow in this tract. During the year 1938-39 there was arrowing in this experiment. Percentage of arrowed canes, presented in table IV showed that arrowing in control is 5·62, while it is low in other treatments. Arrowing was found to decrease with the length in in the period of preservation.

Table III.

Treatments.			Average length of internodes			Average girth of Cane			Average number of internodes.			Average weight of individual canes.		
			I st year.	II nd year.	III rd year.	I st year.	II nd year.	III rd year.	I st year.	II nd year.	III rd year.	I st year.	II nd year.	III rd year.
1. Heap method	15 days	....	4·7	4·7	4·7	2·6	2·9	2·7	26	30	30	3·57	3·96	3·53
2. do.	30 days	....	5·2	4 8	4·7	2·6	2·6	2·7	24	27	27	3·58	3.45	3·53
3. do.	45 days	....	5·0	4·8	4·7	2·6	2·7	2·5	24	27	25	3·25	3·70	3·42
4. N. W. F. method	15 days	....	4·5	4·5	4·7	2·9	2·7	2·8	26	30	29	3·99	3·80	3·74
5. do.	30 days	....	5·2	5·0	4·7	2·8	2·7	2·6	25	27	26	3·94	3·83	3·72
6. do.	45 days	....	4·7	4·3	4·5	2·6	2·9	2·5	24	29	24	3·70	16·00	3·72
7. Kurnool method	15 days	....	5·0	4.4	4·7	2·6	2·6	2·7	25	30	29	3·44	3·88	3·68
8. do.	30 days	....	5·0	5·2	4·9	2·7	2·6	2·5	25	25	26	3·34	3·41	3·26
9. do.	45 days	....	5·2	4·9	4·9	2·6	2·7	2·5	24	26	24	3·12	3·67	3·23
10. Control.		....	5·2	4·6	4·6	2·8	2·8	2·5	27	30	28	3·75	4·09	3·44

Table IV.

ARROWING.

		TREATMENT.									
		Heap Method.			N. W. F. method.			Kurnool method.			Control.
		15 days.	30 days.	45 days.	15 days.	30 days.	45 days.	15 days	30 days.	45 days.	
Percentage of canes arrowed.	....	2·90	1·41	Nil.	1·07	Nil.	Nil.	3·94	1·48	0·94	5·62

Yield:— The mean yields of millable cane in tons per acre for the three years are presented in table V below.

Table V.

Yields (in tons per acre)

	Treatment.		I yr.	II yr.	III yr.	Mean.
1.	Heap method	15 days	55·13	61·24	49·51	55·29
2.	do.	30 days	42·24	51·51	50·63	48·16
3.	do.	45 days	41·33	44·95	39·98	42·09
4.	N. W. F. method	15 days	47·81	54·84	52·12	51.59
5.	do.	30 days	41·39	47·94	40·04	43·12
6.	do.	45 days	28·13	36·41	30·52	31·69
7.	Kurnool method	15 days	56·01	59·61	49·22	54·95
8.	do.	30 days	51·47	47·34	46·60	48·47
9.	do.	45 days	38·87	36·51	35·08	36·82
10.	Control.		60·59	64·58	53·33	59·50
11.	S. E. of treatment mean.		3·75	1·69	1·49	
12.	Critical difference tons per acre.		10·89	4·90	4·33	
13.	Whether significant by 'Z' test.		Yes.	Yes.	Yes.	

The differences between the treatments were significant and the yields from 'heap' 'Kurnool', and N. W. F. methods were in the order of mention. Among the three periods of preservation 15, 30, and 45 days were in the order of merit.

7. *Chemical analysis of the juices:*— Brix, sucrose and purity were estimated in the cane juices from different treatments from November to February. The data are presented in table 6 below.

Table VI.

Chemical analysis of the juices.

Treatment.		I st year.						II nd year.						III rd year.					
		November.			February.			November.			February.			November.			February.		
		Brix.	Sucrose.	Purity.	Brix.	Sucrose.	Purity.	Brix.	Sucrose.	Purity.	Brix.	Sucrose.	Purity	Brix.	Sucrose.	Purjty.	Brix.	Sucrose.	Purity.
1. Heap method	15 days.	13·04	9·81	75·25	20·39	18·06	88·57	14·22	10.86	76·38	19·86	17·53	88·24	13 69	10·69	78·09	17·69	15·34	86·72
do.	30 days	12·54	8·95	71·37	18·99	16·38	86·24	14·62	11·48	78·50	20·16	18·03	89·44	12·89	9·18	71·20	18·49	16·29	88·10
do.	45 days.	12·54	8·70	69·37	18 99	16·50	86·88	13·02	9·46	72·68	19·16	16·95	88·49	11·79	8·10	68·69	17·89	15·67	87.60
2. N.. W. F. method	15 days	13 04	9·18	70·41	19 79	17·37	87·74	13·72	10·63	77·49	19.86	17 62	88·72	13 59	10·27	75·56	18·59	16·50	88·76
do.	30 days.	12·04	8·42	69·93	18·99	16·48	86·76	12·82	9·21	71·85	19·36	16·93	87·46	11·79	8·35	70·81	16·69	14·42	86·40
do.	45 days.	12 04	8·35	69·36	19·99	16·84	87·78	12·92	9·18	71·04	18·68	16·01	85·80	10·39	7·72	64·71	16·49	14·20	86·12
3. Kurnool method	15 days.	13·94	10·50	75 35	20·29	18·18	89·60	14·42	11·25	78 00	19·66	17·39	88·43	13·29	10·01	75·32	18·99	17·22	90·65
do.	30 days	13·44	9·91	73·74	19·89	17·37	87·30	14.22	10·86	76·38	20·36	18·14	89 08	12·89	9·58	74·32	18·89	17·20	91·03
do,	45 days.	12.04	8·10	67·28	18·89	16·23	88·94	13·52	10·26	75·90	19·46	17·03	87·50	11·79	8·22	69·71	18·39	16·51	89·78
4. Control. ...	..	13·04	9·81	75·25	18 59	16·08	86·48	14·32	11·10	77·52	19·46	17 41	89·45	13·99	10·88	77·76	18·79	17 11	91·05

Brix, sucrose and purity were the lowest in 'N. W. F. method' and they also decreased with the increasing period of observation. The low values for the three methods of preservation were more marked in the earlier stages, than at the time of harvest in February or March.

8 *Conclusions:* — The buds at the nodes of sugarcane sets are delicate structures and do not appear to lend themselves easily for preservation as in the case of true seeds. They germinate and give best results if they are planted immediately after harvest. If the sets are preserved by any of the methods described above, the buds and nodal roots develop to different degrees during the course of preservation and this adversely affects the growth in the early periods and maturity and sugar content at the time of harvest If there is any long spell of interval between harvest and planting of any variety of cane, the sets may be preserved by the 'heap method' for periods not exceeding 15 days, but wherever possible, it is recommended that a separate shortcrop is raised for securing sets for planting. This latter method not only provides sets which germinate well and grow vigorously but also enables the cultivator to plant the crop at any time irrespective of the period of harvest.

9. *Summary* — There is need to devise a method for preserving the sugarcane sets for periods upto 2 months. 'Heap method', 'Kurnbol method' and 'N.W.F. method' of preserving sets for 15, 30 and 45 days were tested against the local method.

The sets sprouted to different degrees during the course of preservation The buds at the top half of the cane tended to grow more, than the bottom ones and the reverse was the case with regard to nodal roots. When planted in the field, the 'Kurnool method' and 'N. W. F. method', adversely affected germination.

Height of cane differed significantly between the treatments. Height decreased with the increasing periods of preservation. The differences were more marked in the earlier rather than in the later stages of the crop growth. Length and girth of internodes did not vary but the number of internodes varied.

Average weight of individual canes showed significant decrease with the length in the period of preservation.

The percentage of arrowed canes was lower in the treatments than in the control. With the increase in the period of preservation, the arrowing further decreased.

'Heap method' 'Kurnool method' and 'N.W.F. method' were in the order of merit in respect of yield.

Brix, sucrose and purity were the lowest in the 'N. W. F. method' and these values decreased with increasing periods of preservation in all the treatments.

Wherever possible 'short-crop' method is recommended, failing which preservation by 'heap method' for short periods may be adopted.

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The Problem of Rice Production in Malabar and its Solution

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Out of the annual normal deficit of 5 lakhs of tons of rice (husked rice) in the Madras Presidency, Malabar with an acerage of 9 lakhs of acres and a production of about 3·5 lakhs of tons of rice has a deficit of 2 lakhs of tons It is therefore evident that the problem of the rice deficit of the Madras Presidency is chiefly one of its production in Malabar. The rest of the rice deficit districts have other cereals to depend upon as an alternative but Malabar stands on a different footing The only cereal that is grown is rice and there is even a positive dislike for any other cereal; for the matter of that even wheat, as the recent rationing has shown. The wheat off-take per individual was the lowest in Malabar compared with any other district. Thus rice plays a very important role in the economy of Malabar agriculture.

A detailed description of the different soil and weather conditions (which are beyond human control) the general rice cultivation as at present practised, the tenancy system in Malabar etc., may be necessary as it is only on this back-ground that any programme of increasing the output of rice in this district could be discussed

Soils: The soils of this tract belong to the red ferruginous series and have been mostly derived from the low-level laterite, a younger generation of gneiss, through the action of water expect along the coast which is sandy—mostly transported—with yellowish clay sub-soil. The soils in the three types of rice cultivation i. e. the *modan* (Dry land), the *palliyal* (Single crop) and *wetland* (Double crop) are derived from the same source but the hilly nature of the country and the consequent washing of finer particles lower down brings about a difference in mechanical texture of the several types. Analysis of soils of the Malabar District conducted by the Madras Agricultural Department sometime ago shows the following variation:—

Nitrogen	....	0·05 %	to 0·15 %	and above
Lime	...	0·10 %	to 0·20 %	and above
Magnesia	....	0·10 %	to 0·20 %	and above
Total P-2°5	...	0 05 %	to 0 20 %	and above
Potash	...	0·10 %	to 0·30 %	and above

From the chemical analysis therefore, it cannot be considered that these soils are deficient in the major plantfoods.

Weather: The rainfall which is about 80 inches in the Palghat taluk increases as we go westwards and northwards to about 150 inches in the extreme north of the district. The greatest variation between them is in the three south-west monsoon months of June-August. During the rest of the year the rainfall is almost the same in all places. The range of average rainfall during the several periods for the past 40 years is as follows:–

April–May	....	....	8″ to 12″
June–August	....	....	62″ to 120″
October–December		....	10″ to 16″
January–March	....	....	0″ to 2″

The rainfall in April and May and more so its distribution, is very important in Malabar. These rains help preparation of all types of land; sowing of modan lands, broadcasting in the wetlands and nursery raising for the transplanting of the first crop Any erratic distribution is sure to reflect very adversely on the final yields of the crop. More than three-fourths of the annual rainfall is received during the three months of June to August. The break between the southwest and the retreating monsoon, generally from the last week of August to the middle of September, is again an anxious period on the West Coast. If the drought continues, the *palliyals* suffer badly and the second crop planting also gets delayed with proportionate reduction in yield.

Extremes of heat and cold are unknown on the West Coast, the average maximum of the several months varying only from 88° to 92° F. and the minimum from 70° to 78° F. with the mean range from 78° to 85° F. But the humidity is exceptionally high, the average for the year being round 80 per cent, the three months of June, July and August recording more than 90 per cent. If August happens to be very humid, it has been found that the crop grows very rank and the setting of the grain is impaired. It would seem advantageous to shift forward the flowering phase by putting in the crop slightly later if irrigation facilities are available in the later stages of the second crop.

Cultivation:— With an area of 9 lakhs of acres in the district, paddy cultivation is carried on under a diversity of conditions but in the main there are three types (a) The *modan* or the dry paddy. (b) The single crop land (mostly from June to October or July to January as in the '*Karinkora*' areas or January to April as in the '*Cole*' areas) and (c) The double crop areas along the valleys.

The modan lands constitute the unoccupied dry lands of the district and paddy is grown once in two or three years. The rest of the season they are left fallow or an occasional crop of gingelly is taken from September to December. Tapioca or ginger in some places and rarely chillies are some of the other crops. The fallowing of the *modan* for two or three years is in our opinion not a sound practice though the reason adduced is somewhat convincing It is said that the lands are subject to permanent assessment by Government if cultivated continuously for three years and to avoid this there is an intervening fallow. True, with the very poor constitution of these lands, both physicial and chemical, some fallow is necessary but foregoing a crop for a small charge as assessment would approximate to the maxim 'Pennywise and poundfoolish'. The bulk of these lands have still to be terraced and levelled with proper contour bunding to increase their waterholding capacity. Probably here the State has to undertake the reclamation portion of the work as it is not satisfactorily attempted by the *Jenmies* (Landlords).

Broadcasting of the first crop is carried on in 75 per cent of the double-crop area in the district and the lands are prepared from the time the second crop is harvested as and when the lands permit of such cultivation. The ryot is very eager to sow the crop at the earliest opportunity. His eagerness is partly explained by the fact that if he misses the earliest opportunity of sowing, it may be that he may not get another; or the next rains may be so heavy that he may not be able to sow for a long time to come. The later the sowing goes beyond a certain date the poorer the crop: for, before the monsoon becomes vigorous which may be any time from the first week of June, the broadcast crop should have made sufficient growth to be able to stand the heavy rains. It may sometimes happen that after an auspicious sowing and a good germination the rains in May so necessary to keep the tender crop going may be so scanty that a heavy reduction in yield results whatever the quantity of rain received later. The broadcast crop is thus governed by a large element of chance for its success.

It may be asked why at all broadcasting should be resorted to under such risky conditions. It is believed that a broadcast crop withstands floods that occur in June better than a transplanted crop . But this is not a valid argument, for, where the bulk of broadcasting is done as in Palghat, floods are not so vigorous as in those areas where transplanting is more commonly adopted The real reason, however seems to be that it is a relic of the old custom When the population of the district was small and land was in plenty it would not have been possible to practise transplanting on a large area and so the broadcast system was adopted. But in the system of transplanting, one feature which has to be specially taken care of is the age of seedbed. With short-duration varieties, seedlings aged more than 4-5 weeks result in a poorer yield of the subsequent crop. Hence a large area has to be planted expeditiously and though the population in the tract is large the agricultural labour is still very inadequate at present.

On the singlecrop lands the first crop is invariably transplanted as it is not generally possible to sow them till the first week of June, when the only alternative left is to transplant from nurseries. The second crop closely follows the first without any interval, and this is invariably transplanted except in small areas as in North Malabar where it is broadcast.

Manuring : The manure that the soils of Malabar receive in only a few basket-fuls of ash and powdered cattle manure for the broadcast crop, and a few head-loads of green leaf where the land lies near some forest or near house compounds with trees. The second crop receives green leaves more often than the first crop.

Yields : In spite of the fact that the chemical analysis does not disclose that the soils are very poor in the essential ingredients, the yields of rice in Malabar are very poor, being the poorest in the Presidency. An yield of 5 3 lakhs of tons of paddy is got from the 9 lakhs of acres under rice with an average acre yield of 1300 lbs. of paddy. The average acre yields on the different types of soils are approximately as below :—

Modan	....	600 lbs.
Palliyal (single crop)	....	1,200 lbs.
Wet-lands (first crop)	....	1,400 lbs.
Wet-lands (second crop)	....	1,000 lbs.

It is clear therefore that with an abundant rainfall, good drainage, general healthiness of the crop and absence of any serious epidemics, the problem of improving the yield of Malabar should not be very difficult of solution. The seasons of growing the paddy crop as at-present practised have been fitted into the periods when an adequate rainfall or assured water supply can be counted upon with the attendant good and bad consequences.

Tenures and Tenancy Laws: Almost the whole of the land in Malabar cultivated and uncultivated is private property and held by '*Jenmum*' right which conveys full absolute propriety in the soil. The land-lord is called a '*Jenmi*' and most of the '*Jenmum*' land is in '*Kanam*' which is a tenure partaking of the nature of both a mortgage and lease. The tenant pays a lump sum (*Kanam*) to the *Jenmi*; an annual rent (*Pattam*) is fixed according to the capacity of the land. The '*Kanamdar*' is at liberty to transfer his interest during his tenancy or to sub-mortgage it. Akin to the '*Kanam*' are several varieties of tenures differing chiefly in the amount and nature of the sum advanced to the '*Jenmies*'.

'*Kuzhi Kanam*' tenure is common only in North Malabar where cultivable waste lands are leased out to the tenants known as *Kuzhi Kanamdars* for making improvements in the lands after receiving a lump sum consideration for the same.

The *Verum Pattam* is a simple lease from year to year and the rent is often the whole of the net produce after deducting the bare cost of the seed and cultivation in which case the tenant is practically a labourer on almost subsistence wages. A large proportion of the land is concentrated in the hands of a small class and the welfare of the agricultural community is therefore largely dependent on the relations between this small group of land-lords and their tenants.

Though the *Jenmies* have the proprietory right in lands, they are not as a rule the cultivators. The actual cultivators are *Verum pattomdars* the majority of whom are extremely poor. Absence of interest by rich *Jenmi* is also one of the indirect causes for the low standard of cultivation in Malabar.

The *Kanamdar* is only an intermediary the majority of whom do not cultivate but lease on to a *Verum pattamdar* fixing a high '*Pattam*'. The *Kanamdar* pays as '*Michavaram*' to the *Jenmi* which is usually low thus making a large profit out of the *Pattam* given by the *Verum pattamdar*.

The low yield in the district may be attributed to the following more important causes.

(1) The use of short-duration varieties for the first crop and in some tracts for the second crop also.

(2) In spite of the heavy rainfall, its distribution is often irregular. For a successful crop under broadcast conditions, good soaking rains in the first fort-night of April followed by at least four to six inches of occasional rains in May, and a not-too-long break between the closure of the South-west monsoon in August and the retreating monsoon in September are necessary. For the second crop this condition delays transplanting, resulting in overaged nurseries and shortage of water in the later stages of the crop, unless some late rains occur in North-east monsoon.

(3) Standard of cultivation is poor, the over-lapping of crops without fallow or without replacing the loss of plant-food by proper and adequate manuring.

(4) The abject poverty and chronic indebtedness of the cultivator who is responsible for actually growing the crop.

(5) The all-too-benevolent Nature, which brings unfailing rains during the monsoon resulting in some crop at least, despite the poor cultivation. The ryot's wits are to be sharpened by a struggle against Nature.

To make good the enormous deficit of the district there is no other way than applying scientific knowledge to agricultural practices on the background of the existing environmental conditions. We may deal with them under three main heads:—

1. By Increasing the Area Under Cultivation of Paddy.

(a) Bring Fresh Area Under Paddy.

From the returns of the Revenue Authorities Malabar has 9·6 lakhs of acres of uncultivated lands other than current fallow and 2·5 lakhs of acres under current fallow. The possibilities of bringing a portion of this area under plough on an economic basis under the existing conditions are very remote. The cultivable wastes are situated in very unhealthy surroundings with dearth of labour and transport facilities. Unless these are rectified, involving immense expenditure there is no chance of these areas being brought under the plough.

(b) Increasing the Existing Area.

Modan: It has been pointed out already that this type of dry-land is cultivated once in two or three years with paddy. The rest of the time it will be almost fallow. It is possible to extend the area under this type of land by suitable manuring and conserving the soil and moisture by providing good bunds along the contours. The Malabar ryot has understood and was practising it but owing to the present abnormal dearth of labour, this latter aspect has been neglected and in places gullies have formed eroding the fields. The problem of manuring the modans may have to be tackled from the point of providing a cheap manure as otherwise the gross return, poor as it is, may not pay the cost of manuring. Raising a green manure crop such as wild indigo sown in October rains or *Crotalaria striata* or even raising sunnhemp and ploughing it in during the North-East monsoon rains will be worth attempting. Experience in the Agricultural Research Station, Pattambi, has shown that this is a feasible proposition. By such manuring of these dry-lands higher yields per acre are obtained and with the modest estimate of one lakh of acres of modan land available for cultivation an increased production of a quarter lakh of tons can be achieved.

Single Crop Lands: With the provision of adequate irrigation facilities (dealt with in detail later), some of the single crop lands could be converted into double crop areas. On this account about a lakh of acres of additional second crop area can be got which on a modest estimate, is likely to produce half a lakh of tons of more rice.

Third Crop Areas: The third crop area is possible of expansion with the provision of new wells and repairs to the existing ones. Many of these have accumulated silt and have become shallow. They are in a bad state of disrepair and have to be renovated.

Cole Area: On the *cole* area the *punja* crop as at present grown is a gamble. Either too much rain in April or May or a dearth of fresh water in the storage channels spells disaster to this crop. It would appear possible to practise the '*Udu*' system of cultivation. The proposition is to mix up a short duration and a long duration flood resistant variety. (the proportion to be determined after some experiments and experience in the areas) and plant up or broadcast in January—February. If the season is good the short duration crop may

give a fair yield and the long duration varieties would have grown to sufficient height by the time the floods occur. These varieties grow with the rise of water and their tips are always above the water. These varieties are proposed to be tried in the next season. The selection of the long duration variety has to be done with reference to the depths of water at different places of the cole area. It may be that some of the Assam varieties grown in the Surma valley may be useful here.

2. By Improving Yield Per Acre.

The more fruitful line of attack is the attempt to improve the acre yield of the area that is at present grown.

(a) Improvement in Cultural Practices and Provision of Irrigation Facilities.

Paddy cultivation in Malabar is entirely dependent upon the monsoons which though heavy are often not properly distributed. The seasons are 'set' and therefore under the existing circumstances, where the ryot has no control over the irrigational sources, he has to make the best of the bargain. If the paddy yields are to be improved in Malabar, the cultivator must be made less dependent upon the seasons At present he is obliged to hasten up his sowings with the earliest rains in April and any drought in May (very common) will surely affect the subsequent yields. He must be able to get over this contingency if it occurs This would involve the provision of a net-work of reservoirs which should store the water of the early rains and supply this water to the fields specially in the initial stages. Possibly the ryot may also be able to raise nurseries with the help of this water somewhat a little later than he is at present doing, enabling him to use seedlings of the right age It is not unreasonable to find that the ryot in his anxiety sows the nurseries also with the earliest rains and if the setting of the monsoon is late, his nurseries become over-aged with a considerable reduction of yield of the crop resulting from it. Neither can he postpone it very long, lest he is unable to sow afterwards with the onset of heavy rains.

It is a common experience of the ryot that a broadcast crop under wet conditions with facilities for one or two irrigations after sowing in May gives considerably better yields than the dry broadcastings, specially in seasons of drought in May. Thus specially where broadcasting is practised on a large proportion of the area, provision of these reservoirs would go a long way in stabilising yields.

There is another advantage in trying to postpone the sowings and also converting a portion of the dry broadcast into transplanting. As at present practised, broadcasting in April precludes the growing of green manure crops, as the interval between harvesting of second crop and broadcasting the main crop is too short. By increasing this interval by 15 days to a month, green manure crops come up well with the occasional showers of April and May and contribute towards higher yields of paddy.

In the adequate provision of reservoirs by way of small tanks and big wells, even storage reservoirs by anicuts across hill streams a more secure second crop yield results.

The Palghat taluk with large number of such storage tanks for giving one or two irrigations at the later stages of the second crop is a case in point. The assured supply of water from these irrigation tanks later in the season, enables the ryot to grow long duration varieties, which give increased yields. The planting of the second crop depends upon an early start of the North-East monsoon without any undue prolongation in the interval between the South-West and retreating monsoon. If the start of the monsoon is late, planting gets dealyed and the crop suffers from a number of handicaps, viz. (1) an overage of the seedlings, (2) a short growing period, (3) pests and diseases, specially the stem-borer if the cold winds start in October, and (4) late harvest of the crop with the consequent dearth of water in the last stages of the crop. These could be avoided if planting of the second crop is done as early as possible with the help of water in the reservoirs, tanks or wells. With adequate provision of irrigation facilities high yielding long duration varieties can also be used.

(b) Manuring.

Yields of rice can be surely increased by adequate manuring of the fields. This aspect is important in Malabar for a number of reasons (1) The situation of the rice fields is such that a constant depletion of the finer particles of the soil occur by the gushing of waters in monsoon weather. The rains are of a beating nature and more than 50 per cent of the total rain-fall is contributed by short-lived heavy downpours and this causes a lot of havoc especially in the undulating portions of the country. (2) The intensive cultivation without replenishing the loss of plant-food materials. (3) The soils are very porous and this results in the washing away of the soluble plant-foods. (4) Finally the soils in many places are 'poor', the normal yields being the lowest in the Presidency.

The results of the manurial experiments conducted at the Agricultural Research Station, Pattambi for the past two decades offer a sure method of increasing the paddy yields on the West Coast by manuring (vide Statement I). The following conclusions reached at the station are of interest:—

(1) Green leaf or green manures to the broadcast crop as well as transplant fields increases the yield of paddy (in *modan*, *palliyal* or double crop lands) proportionate to the quantity of leaf applied upto 6,000 lb.

(2) Groundnut cake or ammonium sulphate over a basal dressing of leaf (2,000 lb.) secures increased yields.

(3) Application of groundnut cake at 500 lb. or ammonium sulphate at 150 lb. results in an increased return which covers the cost of the manure even at the prevailing high rates (Groundnut cake at 16 lb. per rupee, ammonium sulphate at 10 lb. per rupee and paddy at 12 lb. per rupee).

(4) When the economics are worked out green leaf is the best. But it is very difficult to get large quantities of leaf required for the enormous areas of paddy in this district.

(5) Application of 300 lb. of cake over 2,000 lb. of leaf gives the highest gross return.

Since production of more paddy is the ultimate aim, the problem of application of artificials has to be viewed on this back-ground and if necessary the sales of cake may have to be subsidised to induce the cultivators to use cake as manure. The fixation of a remunerative price for paddy consistent with the problem of producing the maximum crop has to be taken up by the State.

The other alternative would be a vigorous campaign for the use of green manures on as large an area as possible. The following programme of green manuring is suggested from the experience gained at the Agricultural Research Station, Pattambi.

For Modan Lands: (a) Sowing sunnhemp after harvest of paddy crop in August—September and ploughing it in October—November.

(b) Sowing wild indigo* in August—September and ploughing it in April rains and sowing paddy; it may be also sown as a mixture with any crop sown in August—September.

For Single Crop Lands: (a) Wild indigo as a mixture with horsegram sown in October.

(b) Sunnhemp also can be sown in September—October and ploughed in if North-East monsoon rains are favourable.

Double Crop Lands—(1) First Crop: (a) In the sandy areas which are to be transplanted wild indigo can be grown after the harvest of the second crop; if the North-East monsoon rains are good and if there is sufficient moisture, they may be ploughed up and wild indigo sown.

(b) If this should fail, either daincha or sunnhemp can be raised from March—April and this will be useful for the transplanted crop.

(2) **Second Crop:** For manuring the second crop of paddy, sunnhemp may be raised in '*modan*' after harvest of paddy and a portion of this may be applied to the second crop wet-lands.

The main difficulty at present is the non-availability of green manure seeds at the right time. The uncertainty of the early pre-monsoon rains and also the peculiar position that the actual cultivator occupies in the paddy economy of the tract, are some of the other draw-backs. These impediments, however are not insurmountable. A quickening of the production of green manure seeds in cultivable wastes, importing the seeds and stocking them at different places in the district, enlargement of irrigation facilities to provide one or two irrigations if necessary to the crops, the subsidizing of the sale of green manure seeds till such time as they become somewhat popular, a nominal bonus to growers of these green manure crops are all measures that would speed up the green-manure programme.

(c) **Use of Improved Seed:** By the use of pedigree seed evolved by the Research Station at Pattambi, suited for different seasons it has been found possible to increase the acre yields by 10—15 per cent (Statement II). But as the cultivator on the West Coast is in a state of stupor and has no capital to work with it is very doubtful if he would ever be able to 'buy' the seed from the Agricultural Department which now offers it for sale. The peculiar tenancy laws, his utter dependence upon Nature for successful cropping, the very low standard of living of the cultivators have all been the stumbling blocks for the rapid spread

of the Departmental seed, unlike on the East Coast or in the Deltas The procedure now adopted on the East Coast of making ryots raise seed farms and procurement of the seed so multiplied, has to be modified with regard to this tract. Again the practice of broadcasting prevalent over large areas in the first crop contaminates the seed and it is very difficult to guarantee cent per cent purity under these conditions. Hence it is essential that seed production and distribution of improved strains in Malabar must be arranged by the Agricultural Department itself throughout all the stages. This may involve the creation of Special Seed Production and Distribution Officer with adequate staff and sufficient number of godowns in important centres.

3. Increasing the Standard of Living of the Cultivator.

(a) **Economic Holdings:** In Malabar each person supported by agriculture has 0 9 acres of land. The holdings of Malabar are distributed as follows:—

Size of Holdings:		Percentage of Total:
0 5 acre and less.	...	10
Less than 1 acre.	....	38
Less than 5 acres.	....	39
Less than 10 acres.	....	13

For a family of five the estimated economic holding is five acres and so it is evident that more than 87 percent of the population possess uneconomic holdings. A new outlook on the agricultural enterprise by the Government and the landed aristocracy or the *Jenmies* is needed. The Government on its part has to improve the present tenancy laws which are defective and the *Jennies* or the *Kanamdars* must view with sympathy their tenants' position and also take a living interest in the improvement of their land and thus gradually improve the standard of living of the cultivator when alone, a steady increase in yields can be secured. Kerala including Malabar has the highest literacy in India both among men and women and it should therefore be easy for any programme of agricultural improvement to bear early fruition.

The State should also improve as many irrigational sources as possible. It is encouraging to find that this programme has already been taken on hand by the Government. The poverty of the Malabar cultivator is proverbial and most of

them are heavely in debt. Even the present programme of well-sinking for which there is a great future in Malabar by subsidies etc., has made very poor progress in this part of the country owing to lack of capital with the actual cultivator. This may also have to be done at Government cost and proper water cess may be collected from those who use the water.

(b) **Improvement in tenancy laws:** The three crying evils of the present land tenure system are said to be (1) rack renting (2) the presence of a large class of poor *Verum pattamdars* generally under the *Kanamdars* and (3) inadequate compensation for improvements made.

Without entering into controversial points about the changes in Malabar tenancy the following which are calculated to help the cultivator in taking more interest in the land, are suggested.

(1) The cultivator a *Verum pattamdar* should be made to have a permanent interest in the land by reviving the existing relationship between the landowner and the tenant cultivator.

(2) The number of intermediaries between the *Jenmi* and the actual cultivator is large and this should be reduced to two the *Jenmi* and the cultivator or three at the most; the *Jenmi* the Lesse or *Kanamdar* taking on long leases and the actual cultivator.

(3) Certain disabilities in the cultivation of *modan* lands every year have to be removed by suitable modification of the assessment regulations.

(c) **Intensive Cultivation, New Crops and New Industries:** Another way of looking at the problem of improving the standard of the cultivator in Malabar would be to try and determine the extent of employment which the ryot has actually at present, to find out if he is fully occupied during the 12 months of the year and if not to suggest some suitable sources of employment to him either industrially or agriculturally. Though the industrial potentialities of this region have not been fully worked out the possibilities for such industries giving employment on a large scale are not great. There is an absence of satisfactory employment during the months of May to August, in the bulk of the district. This season of agricultural inertia with its incessant rains also happens to be the season of poverty of coconuts, the crop next in importance to paddy and during this following measures are suggested for consideration.

(1) Area under betel and arecanut palms may be increased.

(2) Fruit trees like jack must be grown on more systematic lines and the area to be increased.

(3) Coffee—the Robusta type which is very successful as a garden crop in the Travancore State, in the forest hill regions may be introduced wherever possible.

(4) Pulses to be tried in two seasons in the *modan* and also in other suitable places where the land is not occupied by paddy. Black and greengram also come up very well in these areas as monsoon crops.

(5) Introduction of long staple cotton in dry lands and house compounds from May-October and the intensification of hand spinning. It was found from experience at the Agricultural Research Station, Pattambi that an acre yield of 300 lb. of kapas can be obtained.

(6) Lac Culture: Inoculation may be done in November-December and the crop may be harvested in June-July.

(7) By organising and extending subsidiary industries such as coir manufacture, arecanut curing etc., and introducing bee-keeping for which there is a vast scope in the upcountry areas.

Resume.

The production of rice in Malabar can be stepped up to make the district self-sufficient at the present ration level of 10 ounces of rice by the following measures (Vide statement III-d).

(1) Increasing the yield and extending the area under dry paddy by adequate manuring and suitable rotations of the *modan* areas.

(2) Increasing the yields of the single crop land by adequate manuring and also assuring water at the end of the season during August-September through canal or well irrigation.

(3) Converting a portion of the single crop area into double crop area and some double crop area into trible crop area by suitable canal irrigation and irrigation from pumps.

(4) Use of improved strains which are suitable to all types of lands; and

(5) Improving the all-round standard of living of the cultivator by improvement in tenancy laws, and enlarging and organising suitable village industries and introduction of new crops.

Summary.

Rice production in Malabar district is short of its annual requirements by about two lakhs of tons. Want of facilities to irrigate at critical periods of the paddy crop, the peculiar tenancy laws, the poverty of the cultivator and inadequacy of manuring are partly responsible for this state of affairs. In this note the prospects of increasing the total output of rice in Malabar are discussed under the above heads and some improvements like provision of additional irrigation facilities and improving the existing ones, growing green manure crops, use of artificial manures and cakes, use of superior strains evolved at the Agricultural Research Station, Pattambi, raising the standard of living of the cultivator by intensification of cropping and improvements in the tenancy laws are suggested, by adopting which it is possible to make this district self-sufficient and thus lessen the over all deficiency of rice in the Presidency to a considerable extent.

Statement I.

Acre Yields on the Agricultural Research Station, PATTAMBI.

Year.	First crop (in lb.)	Second crop. (in lb.)
30—31	2000	1880
31—32	1820	1670
32—33	1790	1760
33—34	2040	1800
34—35	2300	2060
35—36	2400	1970
36—37	2240	2270
37—38	2420	2140
38—39	2320	2030
39—40	2230	2210
40—41	2360	2050
41—42	1980	2020
42—43	2200	2250
43—44	2030	2150
44—45	2270	2110
45—46	2620	1700

Statement II.

YIELD OF PATTAMBI STRAINS:— (First Crop.)

Strains.	Acre yield (in lbs.)	Years.	Duration.
Ptb. 1	2433	9	145 days.
Ptb. 2	2358	10	135 ....
Ptb. 5	2407	10	140 ....
Ptb. 7	2173	10	125 ....
Ptb. 8	2251	10	135 ....
Ptb. 9	2255	10	135 ....
Ptb. 13	2062	6	140 ....
Ptb. 17	2193		150 ....
	Second crop.		
Ptb. 3	1923	9	128 ....
Ptb. 4	2154	9	140 ....
Ptb. 12	1976	4	130 ....
Ptb. 15	2245	4	155 ....
Ptb. 16	2127	4	150 ....
Ptb. 18	1970	2	130 ....
Ptb. 19	2200	1	150 ....
Ptb. 20	2000	1	130 ....

Statement III.

	Present position.			Target aimed.		
	Area. (1000 acres.)	Yield per acre. (rice in lbs.)	Production (rice in tons.)	Area in 1000 acres.	Yield per acre.	Production rice in tons.
Modan	30	400	5300	100	600	26800
Poonam	40	600	10700	40	600	10700
Pallyal .... (Single crop)	280	800	100000	280	1200	150000
Wetland (First crop)	280	940	117600	280	1200	150000
Second crop.	270	800	96400	350	1200	180000
Third crop	7	1000	3000	10	1000	5000
Total	907	....	323000	1050	....	522500

All India Conference on Compost

On the initiative of Srimati Mira Ben a Conference of Provincial Workers and others interested in the Compost Programme was held in the Secretariat Buildings, New Delhi, on the 16th and 17th December 1947.

The Conference was opened by the Hon. Dr. Rajendra Prasad.

Sardar Datar Singh, Vice Chairman, Indian Council of Agricultural Research, in welcoming the delegates and requesting Dr. Rajendra Prasad, Minister for Food and Agriculture to open the Conference mentioned that as a result of researches carried out under the auspices of the Indian Council of Agricultural Research at Bangalore a suitable Process was worked for the Composting of Town Refuse in India; and this scheme which is now supervised by the Government of India, is operating at 600 Municipal Centres in India producing about 5,00,000 tons of compost per year but the scope for extending the work is immense, since there are nearly 4,000 towns in India which can produce about 100 lakh tons of manure. In the villages a good portion of dung is wasted as fuel, while we are losing nearly Rs 100 crores in importing food-stuffs from abroad. A portion of the above sum if it had been spent in increasing the quantity of manure prepared in villages would have not only met our food requirements but would have also improved the fertility level of our soils.

There are huge quantities of cow dung going to waste in our cities, gawshalas and grazing areas The Sewage and Sludge available in our towns is not being utilised for increasing our agricultural production. It sounds bad economics to leave our resources undeveloped while we continue to import increasing quantities of chemical fertilizers and food-stuffs year by year. The progress achieved so far by our urban and village Compost Schemes represents barely 1 to 2 percent of our potential resources and all our attention should be concentrated in the first instance on developing the above resources as rapidly as possible.

The Hon'ble Dr. Rajendra Prasad said:— It is a matter of great pleasure to me to preside over this Conference. We have had various experiments in the past with different kinds of manure which will help to Grow More Food. Whatever may be the individual merits of the different kinds of manure, there is one thing that is sure about farm-yard manure viz. that it not only helps to improve yields, but also keeps up the fertility of the soil through the humus added. As such, there is no question that farm-yard manure is one of the best forms of manure to be used There is also this much to be said in its favour that it can easily be made. We do not require big factories or large areas for this purpose. It gives wealth with little effort. If only we knew how to utilise all that is wasted today, like waste of time, waste of energy, waste of material, waste of food, and last but not least the waste of what we call waste, a great part of our problem will be solved.

Sardar Datar Singh has given you figures with regard to the amount of Compost being prepared at present, but up-till-now we have touched only the fringe of the problem. We have been using farm yard manure from time immemorial but we have not yet realised the importance of every bit of cow dung wasted. I am told that not more than one third of the dung is being utilised as manure, the remaining two-thirds being either burnt as fuel or otherwise wasted. If the remaining two-thirds could also be utilised, we could meet our manurial requirements without any difficulty. The question is how we can do it. Cow-dung is now being used for fuel not because our people do not know its use as manure but because they have no other alternative. If we can give them some alternate fuel, I think, a great amount of cow dung can be kept for manurial purposes. Attempts have been made in certain places to have quick growing trees which would give us fuel, but it requires land for growing the trees and we have to wait for several years before the trees become fit to be used as fuel. My own idea is that as an alternative, we should devote some of the cultivated land for growing crops whose stems can be used for fuel e. g. castor, maize, cotton and even sugarcane. Our Agricultural departments should carry out research to find out such crops as would give us fuel as well as fodder and food. Arhar (tur) is an example of such a crop.

There are other things which require our attention. Cattle urine is wasted almost wholly at present. Simple methods of absorbing the same in ash or earth should be

introduced in villages. Attempts should be made to conserve human excreta in villages by opening trenched latrines Village Co-operative Societies may very well undertake this work. Village bhangis can make a living out of the sale of the manure produced. In cities, the problem is some what different. All the refuse should be converted into compost. The problem of the utilisation of cow dung accumulating in the cities is essentially a problem of transport.

The work detailed above has got to be carried out mainly by the Provincial Governments. Taluka committees and village committees should be made to supervise the work proceeding in their respective areas Pandit K. D. Malaviya recently inaugurated a Compost Week in the United Provinces under which each village was asked to dig at least one trench and fill it up with compost Similar propaganda drives would have to be organised in every province. This is a type of work falling in line with the people and easily accepted by them, once the Government is able to convince the people of the advantages of compost making. The Govenment of India is prepared to back up the proposals that may be put up by the provinces for the above object.

Second Days Proceedings.

The Conference resumed its session at 9 A. M. on the 17th December 1947, with Sardar Datar Singh, Vice-Chairman, Indian Council of Agricultural Research, in the Chair.

The conference formed a Central Compost Development Committee consisting of non-officials and officials with Dr. C. N. Acharya, Chief Biochemist, Ministry of Agriculture, as Secretary, which could act as an advisory body to the Central and Provincial Governments in the matter of Compost Development. A number of resolutions were passed urging on the Central and Provincial Governments to accelerate the present rate of production of Compost from urban and village refuse material. It was estimated that a complete utilisation of our indigenous resources would yeild nearly 300 million tons of additional manure which would give us about 12-15 million tons of extra food-grains and also proportionate quantities of fodder for cattle. This would help to meet the present estimated deficit of 4–5 million tons of food stuffs in the country.

During the course of the discussion, the Hon. Pandit Malaviya mentioned that a compost drive has been started in

the United Provinces which is expected to yield an extra 48 million tons of Compost. Dr. Acharya pointed out that the Chief limiting factor for increasing compost production at present especially of urban compost was transport and motor trucks were in short supply for the purpose Mr. Puri of the Transport Ministry promised to give necessary help of his Ministry in securing the supply of motor trucks for the purpose.

The members of the Conference later met Mahatma Gandhi in the afternoon. Mahatma Gandhi gave his blessings for the success of the work undertaken by the Conference and while doing so humorously remarked that a good work needs no blessings from him, but if the work was bad, he should not bless it and his blessings would turn into curses.

The following is the text of the resolutions passed by the Conference:—

I. This Conference is of the definite opinion that the Compost Programme offers vast potentialities for increasing food production in the country; thus a systematic utilisation of urban wastes would yield about 10 million tons extra manure; similarly a more efficient utilization of our village wastes would add a further 100 million tons of manure, while a programme for providing alternative fuel in place of cow dung would release another 200 million tons of manure; an implementation of the above programme would thus result in the production of an extra 310 million tons of manure which would increase our food production by about 12–15 million tons per year as against our present estimated deficit of 4-5 million tons and at the same time provide additional fodder and help to improve the fertility level of our soils.

II. This Conference has reviewed the work carried out so far under the existing schemes for Composting urban and village refuse and feels that while the work has shown steady development during the last three years, the results achieved so far which represent only 1-2 percent of the total potential capacity should be considered insignificant; and it urges on the Provincial Governments the need for accelerating the pace of the existing schemes so that:—

(a) under the urban compost scheme, all municipalities, notified areas and town committees are brought under the scheme within the next two years and developed to their full production capacity; and

(b) under the village compost scheme, at least 10% of the total number of villages in the Province are taken up during 1948—49 and an additional 10% are taken up in each succeeding year.

III. In regard to the Town Compost Scheme, this Conference makes the following recommendations:—

(a) In view of the present food situation it should be made obligatory on all municipalities, notified areas and town committees that they should convert the whole of their refuse material into compost and for this purpose the facilities required by them by way of expeditious acquisition of land, procurement of transport etc, should be provided by the Provincial Governments; and the municipalities or notified committees should be prohibited from selling uncomposted refuse or night soil to farmers.

(b) The Health Department of the Government of India are requested to issue a directive to provincial Governments (Local Self Government and Health Departments) recommending to them the adoption of the Compost System in preference to other methods of disposal of refuse and strongly urging prohibition of sale of uncomposed night-soil or *katchra* to farmers.

(c) For the disposal of the compost prepared in town areas the help of multi-purpose Co-operative Societies or Taluka Development Associations or similar existing bodies near town centres should be availed of, more actively than at present.

IV. Regarding the Village Compost Scheme, the Conference recommends that:—

(a) The scheme should preferably be operated through Village Panchayats, Kisan Sabhas or Village Co-operative Societies; and in order to help such village organisations with technical advice, demonstrations and training in compost-making and also for the purpose of sending periodical reports, a Compost Supervisor should be posted for each group of 10 villages.

(b) Where the villager possess insufficient or no land for preparing compost, a common land should be acquired by Government for the purpose in the immediate vicinity of the village.

(c) In order to popularise the composting habit among the younger generation of villagers, a practical course in composting should be included in the syllabus in all primary and secondary schools situated in villages; and demonstration pits should be kept in routine operation in each school.

V. The Conference considered in detail the problem of conservation of village night-soil and urine and recommended in this connection that simple dry methods should be adopted for this purpose; and appointed a sub-committee consisting of Shrimati Mira Ben, Shri Shiv Kumar Sharma, Dr. B. N Lal and Dr. K. G. Joshi (with Dr. B. N. Lal as convenor) to prepare an out-line Scheme which could be recommended to Provinces.

VI. This conference desires to draw special attention to the huge stocks of cow dung that lie unutilised in grazing areas, goshalas and cities and urges that special schemes should be drawn up and operated by Provincial Governments for utilising the above stocks.

VII. In addition to the Schemes mentioned above, the Conference recommends that suitable Schemes should be drawn up and operated in each Province for:—

(a) the agricultural utilisation of town sewage, sullage and sludge,

(b) the utilisation of the by-products of the slaughter house and other trade wastes e. g., wool wastes, mill wastes, leather wastes etc. and

(c) for the composting of other materials like water-hyacinth, sugarcane trash, press mud, forest leaves etc; in cases, where village Co-operative Societies or individuals do not come forward to utilise the above materials, it would be advisable to prepare the compost under Government auspices till non-official agencies take it up.

VIII. This Conference is of the opinion that transport has been the chief limiting factor for rapid expansion of the compost scheme and urges on the Government of India and on Provincial Governments to give all necessary help to composting organisations in getting sufficient number of motor trucks for the purpose. It also strongly urges that the trucks at present in use by different Government Departments should also be utilised whenever possible for compost distribution. Transport by canal may also be considered wherever possible.

IX. This Conference urges that intensive propaganda should be carried out among farmers to point out the value of compost manure and for this purpose it urges on the Central and Provincial Governments, to arrange for carrying out the

above propaganda through the medium of ballads, dramas, radio talks, lantern slides, films, posters, pamphlets, exhibition stalls, demonstration plots, lecture tours etc. Existing field publicity vans, newspapers, journals and other media should also be utilised for this purpose.

X. In order to implement the above recommendations and expanded programme of work, the Conference recommends that:—

(a) An all India organisation known as the Central Compost Development Committee consisting of non-officials, officials and comprising the delegates attending this Conference as a nucleus, with Dr. C. N. Acharya as Secretary, be formed, which would act as an advisory body to the Central and Provincial Governments and meet periodically in different Provinces for the purpose.

(b) Each Province should have a Compost Development Officer who would be in charge of the urban and rural compost work and allied manurial schemes in the Province, including the distribution of fertilisers and oil cakes; and the staff at the All India Headquarters should also be adequately strengthened in order to cope with the expanded programmes.

(c) In view of the importance of the Compost Programme sufficient funds should be allocated by the Central and Provincial Governments for implementing the above recommendations and for this purpose, the schemes already included under the five-year development plans have to be suitably amended.

GLEANINGS

New Type of Lucerne.

The Waite Institute in Adelaide, South Australia, has developed a type of lucerne (alfalfa) which, instead of remaining in the same position in the soil with a large tap root, sends out runners which put down roots at intervals and spread the stand. Experiments with the lucerne have been carried out over the past four years.

Sufficient seed of this new type has been produced to enable a sowing of 1 lb. an acre into a mixture of phalaris, clover and Wimmera Rye in pastures at the Institute. The pasture has maintained more than four sheep to the acre, and its yield under continuous grazing has been as good as under rotational grazing. (From Australian News Letter No. AGN/180.)

Lambing Record.

A half-bred Leicester ewe at Magra, in Tasmania (Australia's island State) has produced five lambs in less than seven months. This is claimed as a record.

The ewe gave birth to twins on April 16th 1947, and in November produced triplets. She reared the twins, and is providing food for the triplets. Only very rarely will ewes feed three lambs. (From Australian News Letter No. AGN/180.

Storing Sweet Potatoes.

Farmers are aware that sweet potatoes rot very rapidly after being dug, especially in the hot weather. The following experiment indicates a method of preserving them. About 50 lbs, of sweet potatoes was put in a drum on 17th July 1942 with alternate layers of fresh dried wood ash. Monthly tests indicated that they were keeping well. The drum was finally tipped out on 27th November and only 2 or 3 small potatoes were found to be decomposed. People (in N. Rhodesia) dig sweet potatoes in August, dig a hole in the ground, put a layer of sand, then fill the hole with alternate layer of potatoes and wood ash, finally covering with earth. The tubers keep in good condition until the following February. (Abstract in Planters Chronicle, Vol. 38; p. 525 (1943) from Rhodesian Agricultural Journal.

Crop and Trade Reports.

Statistics Crop-Gingelly-1947-48-Final Reports:—

The average area under gingelly in the Madras Province during the five years ending 1944-45 represented 14·7 per cent of the total area under the crop in India.

The area sown with gingelly in 1947-48 is estimated at 6,70,600 acres which was 0.3 per cent less than that of last year.

The yield per acre is estimated to be normal in East Godavari and below normal in all the other districts of this Province due mainly to the adverse seasonal conditions on account of the failure of the North East Monsoon. The seasonal factor works out to 86 per cent and the total yeild 79,400 tons

Sugarcane-1947 Third or Final Report:—

The average area under sugarcane in the Madras Province during the five years ending 1944-45 represent 3 5 per cent of the total area under sugarcane in India The area planted is estimated at 2,47,430 acres. The yeild per acre is reported to be below normal in all the districts due partly to the untimely rains in December 1947 in the Circars and partly to the failure of the North East Monsoon rains in Curnatic the Central District and the South. The Seasonal factor works out to 89 per cent. On this basis the yeild is estimated to be 61,66,450 tons cane. *(Extract from the Board of Revenue Civil Supplies, Madras.)*

Cotton Raw in the Madras Province.

The receipts of loose cotton at presses and spinning mills in the Madras Province from 1st February 1948 to 2—4—1948 amounted to 50,497 bales of 400 lbs. lint as against an estimate of bales of the total crop of 1947-48. The receipts in the corresponding period of the previous year were 22,731 bales 60 667 bales mainly of pressed cotton were received at spinning mills and 12,246 bales were exported by sea while 21,694 bales were imported by sea mainly from Karachi and Bombay. *(From the Director of Agriculture, Madras)*

OBITUARY.

N. Srinivasalu, who was lastly Agricultural Demonstrator, Gudur died on 18—3—48 at his residence in Venkatagiri town after a very brief illness. He was a bright student at the college, a good Demonstrator and Perfect Gentleman. He joined the Department on 8th December, 1944,

★

We regret to announce the death of C. C. Balanna native of Kurnool Dt., and Farm Manager, Nandyal at the early age of forty one to heart failure. We offer our heartfelt sympathies to the members of the bereaved family.

Weather Review—March 1948.

RAINFALL DATA.

Division	Station	Actual for month	Departure from normal	Total since 1st January	Division	Station	Actual for month	Departure from normal	Total since 1st January
Circars	Gopalpur	0.20	...	4.10	Central (Contd.)	Coimbatore Cotton Breeding Station*	0.38	—0.40	1.37
	Calingapatam	nil	...	1.20					
	Vizagapatam	0.10	...	1.30					
	Anakapalle*	nil	—0.95	0 92		Trichinopoly	0 30	...	1.70
	Samalkotta*	nil	...	1.92					
	Maruteru*	0.48	..	0 78					
	Cocanada	nil	...	1 50	South	Nagapatam	0.10	...	7.10
	Masulipatam	0.10	...	0 20		Aduthurai*	0.23	—0.56	3.78
	Guntur*	nil	—0.43	2.87		Madura	nil	...	2.40
						Pamban	nil	...	3.80
Ceded Dists.	Karnool	0.20	...	0.20		Koilpatti*	1.47	+ 0 40	4 00
	Nandyal*	nil	—0.43	nil		Palamkottah	2.50	...	6.30
	Hagari*	0 01	—0.06	0.10		Pattukottai*	1.43	—0.70	4.52
	Siruguppa*	0.01	—0 22	0.10					
	Bellary	nil	...	nil	West Coast	Trivandrum	2.10	...	3 20
	Rentichintala	nil	...	0 10		Cochin	3.30	...	5.00
	Cuddapah	nil	...	0.00		Pattambi*	2.75	+ 1.89	3.66
	Anantharajapet*	nil	—0.97	0.27		Taliparamba*	0.18	—0.10	1.11
Carnatic	Nellore	0.60	...	1.80		Nileshwar*	0 44	+ 0.16	1.61
	Buchireddi-paalyam*	nil	—0.44	1.40		Mangalore*	1.40	...	2 60
	Madras	nil	...	2.20		Pilicode*	0 05	—0.59	2.30
	Palur*	nil	—0.82	5.23	Mysore & Coorg	Chitaladrug	0 20	...	0 30
	Tindivanam*	0.12	—0.80	2.34		Bangalore	nil	...	0.40
	Tirurkuppam*	0.20	—1.54	2 82		Mysore	0.50	...	0.90
	Cuddalore	nil	..	3.50		Mercara	0.60	...	0 90
Central	Vellore	nil	...	1 60	Hills	Kodaikanal	1.40	...	10.00
	Gudiyattam*	nil	—0.37	0.92		Coonoor*	nil	—2.55	9.51
	Salem	nil	...	0 50		Ootacamund*	0.04	—2.57	2.48
	Coimbatore	0.20	..	1.10		Nanjanad*	0.06	—1.03	2.09
	Coimbatore A. C. & R. I*	0.22	—0.59	1 13					

*Meteorogical Stations of the Madras Agricultural Department.

...Data not available.

Weather was generally dry over the Madras Presidency except for scattered thunderstorms in the South-east Madras, North Madras coast, on the west coast and hills.

Particularly throughout the presidency fairly bright weather was felt. The rainfall also was uniformly below normal.

Weather Report for the Meteorological Observatories at Coimbatore in the month of March 1948.

Report No. 1/48.		Observatories at A. C R. I. 8-22 hours.	Cotton Breeding Station 7-22 hours.
Absolute maximum in shade	...	100°F	102 2°F
Absolute minimum in shade	...	62°F	60.4°F

Report No. 1/48.		Observatories at A. C. R. I. 8–22 hours.	Cotton Breeding Station 7–22 hours.
Mean maximum in shade	...	94.8°F	95.92°F
Departure from normal	...	—0.47	+1.52*
Mean minimum in shade	...	70.4°F	69.88°F
Departure from normal	..	+1.31	+1.78*
Total rainfall for the month	...	0.22"	0.38"
Departure from normal	...	—0.59"	—0.43"
Heaviest fall in 24 hours	...	0 21"	0.36"
Total number of rainy days	...	1	1
Mean daily wind velocity	...	2.25 mph.	3.29 mph.
Departure from normal	...	+ 0.66 mph.	+0.41* mph.
Mean humidity at 8 hours	...	70.15%	78.45%
Departure from normal	...	+1.39%	+5.65%*

*Average of the available nine years data is taken as the normal.

Summary. Dry weather prevailed during the month. The day temperatures were very slightly below normal while the night temperatures were fairly above normal. But if the Cotton Section data are considered, even the day temperatures are slightly above *normal* (average of nine years data and readings being taken one hour earlier).

The humidity was slightly above normal as far as the data pertaining to the A. C. & R. I. are concerned. If Cotton Section data are considered, it is appreciably above normal. (In this case average of only 9 years is taken as the normal and readings were recorded one hour earlier).

Throughout the month the weather was fairly windy and the average velocity of the wind was slightly above normal. *(M. B. V. N. and C. B. M.)*

DEPARTMENTAL NOTIFICATIONS

GAZETTED SERVICE—POSTINGS AND TRANSFERS.

"Sri C. Balasubramania Mudaliar, Assistant to Paddy Specialist, Coimbatore is appointed to act temporarily as Agricultural Metrologist, Coimbatore".

"Sri S. Kanakaraj David, Asst. in Entomology is appointed to act as Assistant Entomologist vice Sri S. Ramachandra Iyer on other duty".

Name of Officers	From	To
Sri N. S. Rajagopal	Horticultural Asst. in College Orchards, Coimbatore	Superintendent, F. R. S., Kodur
„ U. Narasinga Rao,	Superintendent, F. R. S. Kodur	Asst. Fruit Specialist, Coonoor
„ K. Bhushanam	P. A. to D. A. O. Anantapur	D. A. O. Anantapur
„ D. Shanmughasundaram	(on leave)	D. A. O. Vellore
„ M. Ramamurthi	D. A. O (on leave) Vellore	D. A. O. Guntur
„ N. Subramania Ayyar	Regional manure controller, Adoni	Regional Dy. Director of Agriculture, Ellore

Name of Officers	From	To
Sri R. Anandapadmanabha Pillai	A. D. (on leave)	D. A. O. Cuddappah
Janab Muhommad Ali Sahib	D. A. O. (on leave)	Asst. Marketing Officer, Madras
Sri P Satyanarayana	(on leave)	Gazetted Asst in Chemistry, Bapatla
„ K. Veerabhadra Rao	P. A. to D. A. O. Nellore	D. A, O. Nellore
„ G. K. Chidambaram	Asst. Agricultural Chemist, Bapatla	Asst. Agricultural Chemist, Coimbatore

LEAVE

Name of Officers	Period of Leave
Janab Mirza Anser Baig Sahib Bahadur D. A. O. Guntur	Earned leave on full pay for 30 days from the date of relief
Sri G. Ganapathi Iyer, Asst. Agricultural Chemist, Coimbatore	L. A. P. for 4 months from 15—3—48 preparatory to retirement on 14—7—48

SUBORDINATE SERVICE

APPOINTMENTS—TO OFFICIATE AS UPPER SUBORDINATES.

Sri K. Divakaran, B. A., (Botany) as Asst. in Plant Physiology Agricultural College, Bapatla.

Janab Muhamed Ghouse, B. Sc., (Entomology) as Asst. in Entomology Agricultural College, Coimbatore

Sri C. P, Natarajan, B. Sc., (Chemistry) as Asst in Chemistry, Siruguppa

Sri A. P Sarojini, B. A., (Botany) as Asst in Mycology, Coimbatore.

Sri D. P. Rangaswami, on outsider, as Agriculture Demonstrator, Nilakottai

Sri O. Srinivasa Rao, an outsider, as Agricultural Demonstrator, Tiruvarur.

Sri Pitchayya, as Asst. in Paddy, Agricultural Research Station, Tirurkuppam.

Sri T. S Rajagopalan, B Sc., Ag. Agricultural College, Bapatla with effect from the date of joining duty.

Sri C. Venkatapathi Rao Naidu, B. Sc., Ag. Agricultural Demonstrator, Hadgalli.

Sri K. Venkateswaralu, B. Sc., Ag. as Agricultural Demonstrator, Dhone.

Sri M. Subbiah Pillai, Asst. in Paddy, Agricultural College, Coimbatore is transfered to the Government of India and is appointed as Farm Superintendent, Central Rice Reserach Institute, Cuttack.

POSTINGS AND TRANSFERS.

Name of Officers	From	To
Sri N. V. Sundaram	Asst in Mycology A. R. S. Guntur	Asst. in Oil seeds Coconut Nursery Scheme, Pattambi
„ M. Venkataramanamurthi	Asst. in Plant Physiology, Bapatla	A. D Kadiri
„ V. T. R. Rajagopalan	Entomology Asst. Coimbatore	Asst. in Paddy A. R. S. Aduthurai
„ K. Saptharishi	Asst. in Paddy A. R. S. Aduthurai	Asst. to Agri. Meteorologist, Coimbatore
„ S. Madhava Rao	Asst. in Mycology, Coimbatore	Asst in Paddy A. R S. Maruteru
„ K. R. Ramani	A. D. Sattur	A D. Srivilliputhur
„ K. Kuppamuthu	A. D. Srivilliputhur,	A D. Paramakudi
„ T. K. Sankara-subramaniam	A D Paramakudi	A. D. Sathur
„ J. Subramaniam	A. D. Tiruvarur	A D Gudivada
„ R. Subramaniam	Special A. D Tanjore	A D Tanjore
„ P, Satyanarayana	A. D Peddapuram	A. D. Anakapalli
„ M. S. Narayana Reddy	A. D. Anakapalle	Asst. Mungari Cotton Scheme. Adoni
„ S. Kutty Mudali	A. D. Erode (on leave)	A. D. Salem
„ N. Krishna Pillai	P. A. to D. A. O. Sattur	A. D. Devakottai
„ G. Venkatakrishnan	A. D. Devakottai	P. A. to D. A. O. Sattur
„ G. Ranganathaswami	A. D. Kalyandrug	P. A. to D. A. O. Anantapur
„ N. S. Vaidyanathan	A. D. Alathur	A. D. Palghat
„ P. K. Natesa Ayyar	A. D. Palaghat	A. D. Calicut
„ D. Narasimhamurthi	A. D. Kuppam	A. D. Chodavaram
„ D. Rama Rao	A. D. Chodavaram	A. D. Bepalle
„ H. Narasimhamurthi	A. D. Hadagalli	Special A. D. for Sugar Cane Pest Work, Hospect area
„ P. Ramadoss	A. D. Dhone	Cotton Asst. Nandyal
„ N. G. Narayana	(on leave)	Asst, in Cotton A R. S.
„ S. Narasimham	Asst. in Cotton A. R. S. Koilpatti	Asst. in Cotton Section, Coimbatore
„ T. V. Seshadri	A, D. Chittoor	A. D. Venkatagiri
„ M. Venkatramiah	A. D. Venkatagiri	F. M., A. R. S. Guntur
„ M. K Lingaiah	Asst. Biological Station, Coonoor	F M., A, R. S. Willington
Janab Syed Ibrahim Ali	(on leave)	A D. Madurantakam
Sri B Narayana Reddy	(on leave)	A D Chittur
„ G. Raja Rao	(on leave)	Teaching Asst. in Chemist Agricultural College, Bapatla
„ S. Seshagiri Rao	Teaching Asst. in Chemistry Bapatla	Asst. in Chemistry Coimbatore
„ K. L. Ramakrishna Rao	A. D. Mangalore	A. D. Cauvery Mettur project area, Tanjore
„ T. V. Subramaniam	Mycology, Asst Guntur	Asst. Mycology, Coimbatore
„ Joseph Hallegna	Asst. in Mycology, Coimbatore	A D Pattambi
„ P. K. Nambiar	A D, Tellicherry	A. D. Cannanore

Name of Officers	From	To
Sri P. A. Kunhiraman Nambiar	A. D. Cannanore	F. M. Wynad Colonization Scheme
Janab Abdul Hajee Sabib	F. M. Wynad Colonization Scheme	A. D. Mannargudi
Sri T. K. Mukundan	A. D. Mannargudi	A. D. Tellichery
„ B. P. Masilamani	F. M. Botanical Gardens Ootacamund	A. D. Nilakottai

LEAVE.

Name of Officers	Period of Leave
„ B. Padmanabha Raju, Asst. in Paddy A. R. S. Maruter	Earnes leave for 30 days from 15—1—48 and extension of earned leave for 60 days from 14—2—48 and unearned leave on half average pay on M C from 30 days from 14—4—48.
„ K. S. Krisnamuthi, A. D. Tanjore	L. A P for 3 months from 1—3—48
„ M. Krishnaswami Ayyangar, F. M. (on leave)	Extenuon of L. A. P. for 3 months on M. C. from 7—1—48
„ A. R. Krishnamurthi Iyer, A. D. Musiri	L. A. P. for 2 months from the date of relief
„ B. G. Narayana Menon, A. D. Salem	Earned leave for 37 days and unearned leave with full pay for 23 days on M. C. from the date of relief.
„ D. Shanmugasundaram, Upper Subordinate	L. A. P. for 2 months from 2—3—48
„ M. S. Purnalingam Pillai, Agricultural Supervisior, Therumangalakottai Vocation Training Centre	L. A. P. for 4 months and leave on half average pay for 24 months from 10—3—48 preperatory to retirement
„ C. Raman Moosad, A. D. Calicut	L. A. P. for 2 months on M. C. from the date of relief
„ G. Sitaramasastri, A. D. Repalle	L. A. P. from the date, reparatory to retirement on 14—6—48
Janab P. M. Syed, Asst. A. R. S. Nilleswar II	Earned leave for 60 days from the date of relief
Sri J. V. V. Suryanarayana, Agronomy Asst. Anakapalle	Earned leave for 60 days from the date of relief
„ L. K. Narayana Iyer, Asst. A. D Tindivanam	Extension of L. A. P. for 2 months from the preparatory to retirement
„ D. Srinivasa Rao, F. M., A R. S., Guntur	Earned leave for 60 days from 15—3—48
„ P. Kesavunni Nambiar, A. D. Arecanut Processing and Marketing Vettamakulam	L. A. P. for 1 months from 1—4—48, extension for 6 days from
„ R. Narasimhachari, Botany Asst. Wynad Colonization Scheme	Extension of L A. P. for 2 months on M C. from 19—3—48
„ A. K. Nagaratnam, Pulses Asst. Coimbatore	Earned leave for 30 days from 1—4—48
„ B. M Pinto, F M Sims Park, Coonoor	Extension of earned leave for 61 days from 9—3—48
„ T. S. Dhaksinamurthi Special A. D Madukkur	Earned leave for 60 days from 1—4—48